## WHAT IS CLAIMED IS:

1. A method for detecting and classifying anomalies of a surface of a sample of a material suitable for use as a substrate for storage, display or electronic devices, comprising:

supplying radiation to the surface;

detecting radiation from the anomalies of the surface and supplied to the surface to provide an output;

analyzing the output for anomalies and classifying the anomalies; and

varying sensitivity in detecting radiation from the anomalies or a threshold in analyzing the output and using two outputs provided at two or more different sensitivities or two or more different thresholds to arrive at at least one classification of the anomalies.

2. The method of claim 1, said analyzing and classifying including:

processing the output provided at a first detection sensitivity, or the output with a first threshold, and classifying the anomalies in a first classification; and

processing the output provided at a second detection sensitivity different from the first sensitivity, or the output with a second threshold different from the first threshold, and classifying the anomalies in a second classification.

3. The method of claim 1, said classifying comprising comparing the two outputs to determine whether the anomalies in the at least one classification are elongated anomalies, area anomalies or point anomalies.

4. The method of claim 3, wherein the elongated anomalies include macroscratches and microscratches.

5. The method of claim 3, wherein the first detection sensitivity is higher than the second detection sensitivity, wherein one or more anomalies are classified

as elongated anomalies when they are classified as elongated anomalies at the first detection sensitivity whether or not they are classified as elongated anomalies at the second detection sensitivity.

5          6.  ,     The method of claim 3, wherein the first threshold is lower than the second threshold, wherein one or more anomalies are classified as scratches when they are classified as scratches at the first threshold whether or not they are classified as scratches at the second threshold.

10          7.     The method of claim 1, wherein the detecting is performed by means of an optical system and wherein the first sensitivity used in classifying anomalies is the highest sensitivity of the system.

          8.     The method of claim 1, wherein the analyzing is performed by means
15     of a processing system and wherein the first threshold used in analyzing anomalies is the lowest practical threshold of the system.

          9.     The method of claim 1, further comprising displaying only anomalies
20     of sizes that exceed a predetermined value.

          10.    The method of claim 9, further comprising comparing size of each anomaly detected to the predetermined value.

25          11.    The method of claim 1, wherein said classifying classifies the anomalies by means of their distribution over the surface.

          12.    The method of claim 11, wherein said classifying classifies the anomalies detected into two or more of the following three categories: elongated
30     group of anomalies, area group of anomalies or point group of anomalies.

13    The method of claim 12, wherein the elongated group of anomalies includes macroscratches and microscratches.

14.    The method of claim 11, wherein said classifying includes determining distances between the anomalies detected and grouping into groups the anomalies detected that are within a predetermined distance from one another.

15.    The method of claim 14, wherein said classifying classifies the anomalies detected by grouping anomalies into a group only when the number of anomalies in the group exceeds a preset value.

16.    The method of claim 14, wherein said determining also determines length and width of a boundary on the surface enclosing at least one group of anomalies detected, and said classifying classifies the anomalies in said at least one group as those forming an elongated group when ratio of the length to the width of the boundary exceeds a preset value, and classifies the anomalies in said at least one group as those forming an area group when ratio of the length to the width of the boundary does not exceed a preset value.

17.    The method of claim 16, wherein said classifying classifies the anomalies in an elongated group as those forming a microscratch when the length of the boundary is less than a preset value.

18.    The method of claim 11, wherein said classifying classifies the anomalies in a group as point group of anomalies when the number of anomalies in the group does not exceed a preset value.

20.    The method of claim 1, wherein said supplying includes directing a beam of radiation along a direction to the surface.

21.    The method of claim 20, wherein said detecting detects radiation scattered by the anomalies.

22.    The method of claim 21, wherein said detecting detects radiation scattered by the anomalies along a direction away from a specular reflection direction of the beam by the surface.

23.    The method of claim 1, further comprising displaying the anomalies detected.

24    The method of claim 1, further comprising controlling a sample processing parameter in response to the at least one classification.

25.    A method for classifying anomalies of a surface of a sample of a material suitable for use as a substrate for storage, display or electronic devices, comprising:

obtaining information concerning anomalies of the surface;
processing the information using a first threshold to provide a first output;
processing the information using a second threshold different from the first threshold to provide a second output; and
analyzing the outputs and classifying the anomalies in at least one classification.

26.    The method of claim 25, said analyzing comprising comparing the two outputs to determine whether the anomalies are scratches, area anomalies or point anomalies.

27.    The method of claim 25, wherein the first threshold is higher than the second threshold, wherein one or more anomalies are classified as scratches when they are classified as

scratches at the second threshold whether or not they are classified as scratches at the first threshold .

28. The method of claim 25, further comprising displaying only anomalies of sizes that exceed a predetermined threshold.

29. The method of claim 28, further comprising comparing size of each anomaly detected to the predetermined threshold.

30. The method of claim 25, wherein said classifying classifies the anomalies by means of their distribution over the surface.

31. The method of claim 30, wherein said classifying classifies the anomalies detected into two or more of the following three categories: scratches, areas and point defects.

32. The method of claim 31, wherein said classifying includes determining distances between the anomalies detected and grouping into groups the anomalies detected that are within a predetermined distance from one another.

33. The method of claim 32, wherein said classifying classifies the anomalies detected by grouping anomalies into a group only when the number of anomalies in the group exceeds a preset value.

34. The method of claim 32, wherein said determining also determines length and width of a boundary on the surface enclosing at least one group of anomalies detected, and said classifying classifies the anomalies in said at least one group as those forming a scratch when ratio of the length to the width of the boundary exceeds a preset value, and classifies the anomalies in said at least one

group as those forming a area when ratio of the length to the width of the boundary does not exceed a preset value.

35.    The method of claim 34, wherein said classifying classifies the anomalies in said at least one group as those forming a microscratch when the length of the boundary is less than a preset value.

36.    The method of claim 32, wherein said classifying classifies the anomalies in a group as point anomalies when the number of anomalies in the group does not exceed a preset value.

37.    The method of claim 25, further comprising displaying the anomalies detected.

38.    The method of claim 37, wherein the displaying displays only anomalies of sizes that exceed a predetermined threshold.

39.    The method of claim 38, further comprising comparing size of each anomaly detected to the predetermined threshold.

40    The method of claim 25, further comprising controlling a sample processing parameter in response to the at least one classification.

41.    A system for detecting and classifying anomalies of a surface of a sample of a material suitable for use as a substrate for storage, display or electronic devices, comprising:

a source supplying radiation to the surface;

one or more detectors detecting anomalies of the surface by detecting radiation from the anomalies supplied to the surface to provide an output or outputs; and

a processor processing the output(s) and classifying the anomalies in at least one classification, wherein said detectors detect the anomalies at at least two different sensitivities to provide the output(s) or said processor processes the output(s) at at least two different thresholds, to provide said at least one classification.

42. The system of claim 41, said processor processes the one or more outputs and classifies the anomalies by:

analyzing the output(s) obtained at a first sensitivity or the output(s) at a first threshold and classifying the anomalies in a first classification; and

analyzing the output(s) obtained at a second sensitivity different from the first sensitivity or the output(s) at a second threshold different from the first threshold and classifying the anomalies in a second classification.

43. The system of claim 41, wherein the source directs a beam of radiation along a direction to the surface.

44. The system of claim 41, wherein said one or more detectors detect radiation scattered by the anomalies.

45. The system of claim 44, wherein said one or more detectors detect radiation scattered by the anomalies along one or more directions away from a specular reflection direction of the beam by the surface.

46. The system of claim 41, wherein the source provides a beam to illuminate the surface by flood illumination.

47. The system of claim 46, said system comprising a plurality of detectors located to detect radiation from the anomalies along a specular reflection direction of the beam by the surface.

48.    The system of claim 41, wherein the source provides a beam of electrons, or electromagnetic radiation having wavelengths in the infrared, ultraviolet, X-ray or microwave range.

5     49.    A system for detecting and classifying anomalies of a surface of a sample of a material suitable for use as a substrate for storage, display or electronic devices, and for controlling processing, comprising:

a source supplying radiation to the surface;

one or more detectors detecting anomalies of the surface by detecting
10    radiation from the anomalies supplied to the surface to provide one or more outputs;

a processor processing the one or more outputs and classifying the anomalies in at least one classification, wherein said detectors detect the anomalies at at least two different sensitivities to provide the output(s) or said processor processes the output(s) at at least two different thresholds, to provide said at least one
15    classification; and

a device processing the sample according to one or more processing parameters, wherein said device alters said one or more processing parameters in response to the at least one classification.